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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XD210

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to a 3D Seismic Survey in Prudhoe Bay, Beaufort Sea, Alaska

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: In accordance with the Marine Mammal Protection Act (MMPA) regulations, notice is hereby given that NMFS has issued an Incidental Harassment Authorization (IHA) to BP Exploration (Alaska) Inc. (BP) to take marine mammals, by harassment, incidental to conducting an ocean-bottom sensor seismic survey in Prudhoe Bay, Beaufort Sea, Alaska, during the 2014 open water season.

DATES: Effective July 1, 2014, through September 30, 2014.

ADDRESSES: Electronic copies of the IHA, application, and associated Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) may be obtained by writing to Jolie Harrison, Supervisor, Incidental Take Program, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910, telephoning the contact listed below (see FOR FURTHER INFORMATION CONTACT), or visiting the internet at:

<http://www.nmfs.noaa.gov/pr/permits/incidental.htm>. Documents cited in this notice may also be viewed, by appointment, during regular business hours, at the aforementioned address.

FOR FURTHER INFORMATION CONTACT: Candace Nachman, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 et seq.) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking, other means of effecting the least practicable impact on the species or stock and its habitat, and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. NMFS has defined “negligible impact” in 50 CFR 216.103 as “...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.”

Except with respect to certain activities not pertinent here, the MMPA defines “harassment” as: “any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption

of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].”

Summary of Request

On December 30, 2013, NMFS received an application from BP for the taking of marine mammals incidental to conducting a 3D ocean-bottom sensor (OBS) seismic survey. NMFS determined that the application was adequate and complete on February 14, 2014.

BP proposes to conduct a 3D OBS seismic survey with a transition zone component on state and private lands and Federal and state waters in the Prudhoe Bay area of the Beaufort Sea during the open-water season of 2014. The activity would occur between July 1 and September 30; however, airgun operations would cease on August 25. The following specific aspects of the activity are likely to result in the take of marine mammals: airguns and pingers. Take, by Level B harassment only, of 9 marine mammal species is anticipated to result from the specified activity.

Description of the Specified Activity

Overview

BP’s proposed OBS seismic survey would utilize sensors located on the ocean bottom or buried below ground nearshore (surf zone) and onshore. A total of two seismic source vessels will be used during the proposed survey, each carrying two airgun sub-arrays. The discharge volume of each airgun sub-array will not exceed 620 cubic inches (in³). To limit the duration of the total survey, the source vessels will be operating in a flip-flop mode (i.e., alternating shots); this means that one vessel discharges airguns when the other vessel is recharging.

The purpose of the proposed OBS seismic survey is to obtain current, high-resolution seismic data to image existing reservoirs. The data will increase BP’s understanding of the

reservoir, allowing for more effective reservoir management. Existing datasets of the proposed survey area include the 1985 Niakuk and 1990 Point McIntyre vibroseis on ice surveys. Data from these two surveys were merged for reprocessing in 2004. A complete set of OBS data has not previously been acquired in the proposed survey area.

Dates and Duration

The planned start date of receiver deployment is approximately July 1, 2014, with seismic data acquisition beginning when open water conditions allow. This has typically been around July 15. Seismic survey data acquisition may take approximately 45 days to complete, which includes downtime for weather and other circumstances. Seismic data acquisition will occur on a 24-hour per day schedule with staggered crew changes. Receiver retrieval and demobilization of equipment and support crew will be completed by the end of September. To limit potential impacts to the bowhead whale fall migration and subsistence hunting, airgun operations will conclude by midnight on August 25. Receiver and equipment retrieval and crew demobilization would continue after airgun operations end but would be completed by September 30. Therefore, the dates for the IHA are July 1 through September 30, 2014.

Specified Geographic Region

The proposed seismic survey would occur in Federal and state waters in the Prudhoe Bay area of the Beaufort Sea, Alaska. The seismic survey project area lies mainly within the Prudhoe Bay Unit and also includes portions of the Northstar, Dewline, and Duck Island Units, as well as non-unit areas. Figures 1 and 2 in BP's application outline the proposed seismic acquisition areas. The project area encompasses approximately 190 mi², comprised of approximately 129 mi² in water depths of 3 ft and greater, 28 mi² in waters less than 3 ft deep, and 33 mi² on land. The approximate boundaries of the project area are between 70°16' N. and 70°31' N. and

between 147°52' W. and 148°47' W. and include state and federal waters, as well as state and private lands. Activity outside the 190 mi² area may include source vessels turning from one line to the other while using mitigation guns, vessel transits, and project support and logistics.

Detailed Description of Activities

OBS seismic surveys are typically used to acquire 3D seismic data in water that is too shallow for towed streamer operations or too deep to have grounded ice in winter. Data acquired through this type of survey will allow for the generation of a 3D sub-surface image of the reservoir area. The generation of a 3D image requires the deployment of many parallel receiver lines spaced close together over the area of interest. The activities associated with the proposed OBS seismic survey include equipment and personnel mobilization and demobilization, housing and logistics, temporary support facilities, and seismic data acquisition. The Notice of Proposed IHA (79 FR 21354, April 15, 2014) contains a full detailed description of the 3D OBS seismic survey, including the recording system and seismic source. That information has not changed and is therefore not repeated here.

Comments and Responses

A Notice of Proposed IHA was published in the Federal Register on April 15, 2014 (79 FR 21354) for public comment. During the 30-day public comment period, NMFS received two comment letters from the following: the Marine Mammal Commission (MMC) and one private citizen. All of the public comments received on the Notice of Proposed IHA are available on the Internet at: http://www.nmfs.noaa.gov/pr/pdfs/permits/bp_prudhoebay_comments.pdf.

Following is a summary of the comments and NMFS' responses.

Comment 1: The private citizen's letter requested that NMFS deny BP's request because the survey will kill marine mammals.

Response: As explained in detail in the analysis of the proposed IHA and the associated EA, this seismic survey is not anticipated to result in any injuries, serious injuries, or mortalities of marine mammals, and NMFS has not authorized any takes by injury or death. The most common types of impacts from the proposed survey are minor changes in behavior. Moreover, BP proposed to and NMFS has required the implementation of several mitigation measures to reduce impacts to marine mammals to the lowest level practicable. NMFS determined that the impact of the 3D OBS seismic survey may result, at worst, in a temporary modification in behavior of small numbers of certain species of marine mammals that may occur in the vicinity of the proposed activity.

Comment 2: The MMC states that an accurate characterization of the size of the harassment zone is necessary for obtaining reliable estimates of the numbers of animals taken. The MMC questioned the use of data from sound source verification (SSV) tests from other airgun arrays in the Beaufort Sea because of the different discharge volumes. The MMC recommends that NMFS require BP to conduct sound source and sound propagation measurements for the proposed seismic survey to ensure that the exclusion and harassment zones have not been underestimated. The methods used to calculate the zones should be reviewed and cross-checked before they are implemented. In at least one previous IHA, the methods and calculations were not reviewed and the zones were reduced during the survey. After the calculations were reviewed post-survey, it became apparent that the zones were reduced incorrectly. Therefore, the MMC recommends that NMFS only authorize an adjustment in the size of the exclusion and/or harassment zones during the open-water season if the size(s) of the estimated zones are determined to be too small.

Response: Discharge volume, while a factor in determining sound isopleths, is not the

only determining factor and not necessarily the most important factor. The sound pressure of an array is not a linear function of the discharge volume. Rather, the sound pressure is dependent on many factors, such as the number of guns in the array, the discharge volume of each individual gun, the composition of each individual gun (with varying discharge volume) in the array, the distance between each gun, the distance between the subarrays, etc. Because the sound pressures in the far field from an airgun array increase with the number of airguns and with the cube root of the total discharge volume, generally speaking, the number of guns is more important than the total discharge volume for determining source levels. The source levels for the 16-gun 640 in³ array (used in 2012 in Simpson Lagoon, Beaufort Sea, Alaska) and the 16-gun 1240 in³ (proposed for this Prudhoe Bay survey) are very similar (223 and 224 dB re 1 μ Pa rms, respectively). Additionally, the source levels for the eight-gun 880 in³ array (used in 2008 in shallow water environments of the Beaufort Sea) and the eight-gun 620 in³ array (proposed for this Prudhoe Bay survey) are very similar (217 and 218 dB re 1 μ Pa rms, respectively). BP also used isopleth results from previous SSV tests when a 640 in³ array and an 880 in³ array were used in combination. That would then result in a total discharge volume of 1520 in³, which is greater than the total discharge volume of the two subarrays planned for this particular survey (i.e., 1240 in³). Based on this information, NMFS determined that BP's approach of using previous SSV results from very similar airgun arrays used in very similar environments in the Alaskan Beaufort Sea was appropriate to characterize the size of the harassment zone.

NMFS determined that requiring additional SSV tests for the array proposed to be used in this survey unwarranted. The data used by BP to estimate the relevant isopleths for this survey are fair representations of what is likely to be expected in Prudhoe Bay. Because of the difficulties in conducting SSV tests in extremely shallow water environments (generally less than

10-20 ft of water), such as the one in the proposed survey area, results would not provide any additional useful information. Additionally, the requirement to conduct another SSV in a region where numerous such tests have already been conducted would add additional, unnecessary sound into the marine environment without yielding newer, more valuable data. NMFS does not intend to authorize any changes to the estimated isopleths (described later in this document) after the IHA is issued.

Comment 3: The MMC disagrees with using the area of a circle to estimate the size of the ensonified area. According to the MMC, this would only be correct if the sound source were stationary. For surveys in which the source is moving (i.e., towed airgun arrays), the ensonified area should instead be based on the total linear distance surveyed by the vessel in a day, taking into account the distance to the Level B harassment threshold, which would presumably produce an area greater than that calculated by using the area of a circle. BP and NMFS should use that revised estimate of the ensonified area to determine the numbers of animals that could be taken. The MMC recommends that NMFS require BP to recalculate take estimates for beluga and bowhead whales and ringed, bearded, and spotted seals using the revised ensonified area estimate for a moving sound source.

Response: In shallow water heterogeneous environments (such as that for the proposed survey), propagation conditions change as the vessels move; therefore, using the total linear distance surveyed by the vessel in a day would not necessarily result in estimates that are any more accurate than the method of using the area of a circle. In deeper water with more constant oceanographic and bathymetric conditions, a complex polygon based on propagation modeling is likely a better method to employ. However, BP will conduct surveys in extremely shallow water (75% of the survey in water depths less than 20 ft and the remaining survey in water depths less

than 40 ft). The total ensonified area, as estimated in BP's application, also slightly overestimates the total area because BP did not delete the areas of overlap between the two seismic source vessels. NMFS agrees that the methods used to calculate take provide an accurate representation of the numbers of marine mammals that may potentially occur in the Level B harassment zone.

Comment 4: The MMC states that for beluga and bowhead whales, NMFS used average rather than maximum densities as the basis for its proposed takes. NMFS indicated that 2012/2013 survey data included sightings and effort data in the estimation of densities from areas more offshore than what would be included in the proposed survey, thus the maximum densities would overestimate the numbers of animals expected in the nearshore waters of the survey. According to the MMC, although that rationale might be appropriate for beluga whales, which are typically found in greater numbers offshore than in the proposed survey area, it is not appropriate for bowhead whales, which the MMC expects would be more likely to occur at maximum densities closer to shore. In any case, the MMC has commented on several occasions that NMFS is inconsistent in its use of average versus maximum densities to estimate takes and has recommended that maximum densities be used due to uncertainties in the density and abundance of marine mammal species in the Beaufort Sea and the increasing inter-annual variability in environmental conditions in the Arctic. Takes based on maximum densities would also provide greater assurance that the total potential taking has no more than a negligible impact on the affected stocks. For those reasons, the MMC recommends that NMFS use species-specific maximum density estimates as the basis for estimating the numbers of marine mammals to be taken.

Response: NMFS determined that the use of average rather than maximum density

estimates for bowhead whales was appropriate for estimating takes. In July and August (the months when BP proposes to conduct seismic data acquisition), bowhead whales are not commonly observed in the central Alaskan Beaufort Sea. During this time of year, the majority of the bowhead whale population is found in the Canadian Beaufort Sea. The fall migration westward through the Alaskan Beaufort Sea does not typically begin until late August or early September, after BP will have completed seismic airgun operations. Moreover, during a similar survey in Simpson Lagoon in 2012, there were no cetacean sightings during the entirety of the project. Therefore, NMFS determined that the method used to calculate bowhead whale takes was appropriate.

While there is a chance that the inter-annual variability in environmental conditions in the Arctic may lead to changes in the presence and density estimates of marine mammals, BP relied on the most recent, best available data in deriving its density estimates for bowhead and beluga whales. By using data from NMFS aerial surveys flown in 2012 and 2013, higher density estimates were derived than if data from previous years had been used. Again indicating that the estimates are likely accurate. Additionally, NMFS determined that the total potential taking will have no more than a negligible impact on the affected stocks.

Comment 5: The MMC states that BP has proposed that observers would monitor for marine mammals 30 minutes before and during the proposed activities. NMFS agreed with that approach but did not include a requirement for post-activity monitoring. The MMC states, in general, post-activity monitoring is needed to ensure that marine mammals are not taken in unexpected or unauthorized ways or in unanticipated numbers. Some types of taking (e.g., taking by death or serious injury) may not be observed until after the activity has ceased. Post-activity monitoring is the best way, and in some situations may be the only reliable way, to

detect certain impacts. Accordingly, the MMC recommends that NMFS require BP to monitor for marine mammals 30 minutes before, during, and 30 minutes after the proposed activities.

Response: NMFS has included a requirement in the IHA that observers monitor for marine mammals 30 minutes before, during, and 30 minutes after the use of the seismic airguns.

Comment 6: The MMC states that two observers would increase the probability of detecting marine mammals approaching or within harassment zones, especially when they are of considerable size. Additional observers could also assist in the collection of data on activities, behavior, and movements of marine mammals in the exclusion and disturbance zones.

Behavioral response information is critical for understanding the effect of acoustic activities on various marine mammal species. The MMC recommends that NMFS require BP to deploy a minimum of two protected species observers (PSOs) to: (1) increase the probability of detecting all marine mammals in or approaching the Level B harassment zones, and (2) assist in the collection of data on activities, behavior, and movements of marine mammals around the source.

Response: The two source vessels are small, with little space available for extra people to be onboard. While there will be two PSOs on each source vessel, only one will officially be on duty per shift. However, the other PSO, as well as the crew members will help to locate marine mammals when possible and notify the on-duty PSO. Because two source vessels will be operating, each with a requirement for an on-duty PSO during seismic airgun operations, two PSOs will be on-duty during all active operations (just not on the same vessel).

NMFS does not anticipate that PSOs will be able to document all marine mammals within the Level B harassment zone. However, because of the small size of the Level A harassment zones for the full array (300 m for the 190 dB isopleth and 600 m for the 180 dB isopleth), NMFS determined that the PSOs will be able to effectively implement mitigation

measures, especially with the aid of crew members calling for the implementation of mitigation measures. Also, based on the location and time frame of the survey, cetaceans are highly unlikely to occur in the vicinity of the survey. Therefore, NMFS determined that one PSO on-duty per vessel per shift is sufficient to watch for and record information about marine mammals.

Description of Marine Mammals in the Area of the Specified Activity

The Beaufort Sea supports a diverse assemblage of marine mammals. Table 1 lists the 12 marine mammal species under NMFS jurisdiction with confirmed or possible occurrence in the proposed project area.

Table 1. Marine mammal species with confirmed or possible occurrence in the proposed seismic survey area.

Common Name	Scientific Name	Status	Occurrence	Seasonality	Range	Abundance
Odontocetes						
Beluga whale (Beaufort Sea stock)	<u>Delphinapterus leucas</u>	-	Common	Mostly spring and fall with some in summer	Russia to Canada	39,258
Killer whale	<u>Orcinus orca</u>	-	Occasional/ Extralimital	Mostly summer and early fall	California to Alaska	552
Harbor porpoise	<u>Phocoena phocoena</u>	-	Occasional/ Extralimital	Mostly summer and early fall	California to Alaska	48,215
Narwhal	<u>Monodon monoceros</u>	-				45,358
Mysticetes						
Bowhead whale	<u>Balaena mysticetus</u>	Endangered; Depleted	Common	Mostly spring and fall with some in summer	Russia to Canada	16,892
Gray whale	<u>Eschrichtius robustus</u>	-	Somewhat common	Mostly summer	Mexico to the U.S. Arctic Ocean	19,126
Minke whale	<u>Balaenoptera acutorostrata</u>	-				810-1,003
Humpback whale (Central North Pacific stock)	<u>Megaptera novaeangliae</u>	Endangered; Depleted				21,063
Pinnipeds						
Bearded seal (Beringia distinct population)	<u>Erignathus barbatus</u>	Threatened; Depleted	Common	Spring and summer	Bering, Chukchi, and Beaufort Seas	155,000

segment)						
Ringed seal (Arctic stock)	<u>Phoca hispida</u>	Threatened; Depleted	Common	Year round	Bering, Chukchi, and Beaufort Seas	300,000
Spotted seal	<u>Phoca largha</u>	-	Common	Summer	Japan to U.S. Arctic Ocean	141,479
Ribbon seal	<u>Histiophoca fasciata</u>	Species of concern	Occasional	Summer	Russia to U.S. Arctic Ocean	49,000

Endangered, threatened, or species of concern under the Endangered Species Act (ESA); Depleted under the MMPA

The highlighted (grayed out) species in Table 1 are so rarely sighted in the central Alaskan Beaufort Sea that their presence in the proposed project area, and therefore take, is unlikely. Minke whales are relatively common in the Bering and southern Chukchi seas and have recently also been sighted in the northeastern Chukchi Sea (Aerts et al., 2013; Clarke et al., 2013). Minke whales are rare in the Beaufort Sea. They have not been reported in the Beaufort Sea during the Bowhead Whale Aerial Survey Project/Aerial Surveys of Arctic Marine Mammals (BWASP/ASAMM) surveys (Clarke et al., 2011, 2012; 2013; Monnet and Treacy, 2005), and there was only one observation in 2007 during vessel-based surveys in the region (Funk et al., 2010). Humpback whales have not generally been found in the Arctic Ocean. However, subsistence hunters have spotted humpback whales in low numbers around Barrow, and there have been several confirmed sightings of humpback whales in the northeastern Chukchi Sea in recent years (Aerts et al., 2013; Clarke et al., 2013). The first confirmed sighting of a humpback whale in the Beaufort Sea was recorded in August 2007 (Hashagen et al., 2009) when a cow and calf were observed 54 mi east of Point Barrow. No additional sightings have been documented in the Beaufort Sea. Narwhal are common in the waters of northern Canada, west Greenland, and in the European Arctic, but rarely occur in the Beaufort Sea (COSEWIC, 2004). Only a handful of sightings have occurred in Alaskan waters (Allen and Angliss, 2013). These three species are not considered further in this IHA notice. Both the walrus and the polar bear could occur in the U.S. Beaufort Sea; however, these species are managed by the U.S. Fish

and Wildlife Service (USFWS) and are not considered further in this IHA.

The Beaufort Sea is a main corridor of the bowhead whale migration route. The main migration periods occur in spring from April to June and in fall from late August/early September through October to early November. During the fall migration, several locations in the U.S. Beaufort Sea serve as feeding grounds for bowhead whales. Small numbers of bowhead whales that remain in the U.S. Arctic Ocean during summer also feed in these areas. The U.S. Beaufort Sea is not a main feeding or calving area for any other cetacean species. Ringed seals breed and pup in the Beaufort Sea; however, this does not occur during the summer or early fall. Further information on the biology and local distribution of these species can be found in BP's application (see ADDRESSES) and the NMFS Marine Mammal Stock Assessment Reports, which are available online at: <http://www.nmfs.noaa.gov/pr/species/>.

Potential Effects of the Specified Activity on Marine Mammals

This section includes a summary and discussion of the ways that the types of stressors associated with the specified activity (e.g., seismic airgun and pinger operation, vessel movement) have been observed to or are thought to impact marine mammals. This section may include a discussion of known effects that do not rise to the level of an MMPA take (for example, with acoustics, we may include a discussion of studies that showed animals not reacting at all to sound or exhibiting barely measurable avoidance). The discussion may also include reactions that we consider to rise to the level of a take and those that we do not consider to rise to the level of a take. This section is intended as a background of potential effects and does not consider either the specific manner in which this activity will be carried out or the mitigation that will be implemented or how either of those will shape the anticipated impacts from this specific activity. The "Estimated Take by Incidental Harassment" section later in this

document will include a quantitative analysis of the number of individuals that are expected to be taken by this activity. The “Negligible Impact Analysis” section will include the analysis of how this specific activity will impact marine mammals and will consider the content of this section, the “Estimated Take by Incidental Harassment” section, the “Mitigation” section, and the “Anticipated Effects on Marine Mammal Habitat” section to draw conclusions regarding the likely impacts of this activity on the reproductive success or survivorship of individuals and from that on the affected marine mammal populations or stocks.

Operating active acoustic sources, such as airgun arrays, has the potential for adverse effects on marine mammals. The majority of anticipated impacts would be from the use of acoustic sources.

The effects of sound from airgun pulses might include one or more of the following: tolerance, masking of natural sounds, behavioral disturbance, and temporary or permanent hearing impairment or non-auditory effects (Richardson et al., 1995). However, for reasons discussed in the proposed IHA, it is unlikely that there would be any cases of temporary, or especially permanent, hearing impairment resulting from BP’s activities. As outlined in previous NMFS documents, the effects of noise on marine mammals are highly variable, often depending on species and contextual factors (based on Richardson et al., 1995).

In the “Potential Effects of the Specified Activity on Marine Mammals” section of the Notice of Proposed IHA (79 FR 21354, April 15, 2014), NMFS included a qualitative discussion of the different ways that BP’s 2014 3D OBS seismic survey program may potentially affect marine mammals. The discussion focused on information and data regarding potential acoustic and non-acoustic effects from seismic activities (i.e., use of airguns, pingers, and support vessels and aircraft). Marine mammals may experience masking and behavioral disturbance. The

information contained in the “Potential Effects of Specified Activities on Marine Mammals” section from the proposed IHA has not changed. Please refer to the proposed IHA for the full discussion (79 FR 21354, April 15, 2014). A short summary is provided here.

Marine mammals may behaviorally react when exposed to anthropogenic sound. These behavioral reactions are often shown as: changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where sound sources are located; and/or flight responses (e.g., pinnipeds flushing into water from haulouts or rookeries).

Masking is the obscuring of sounds of interest by other sounds, often at similar frequencies. Marine mammals use acoustic signals for a variety of purposes, which differ among species, but include communication between individuals, navigation, foraging, reproduction, avoiding predators, and learning about their environment (Erbe and Farmer, 2000; Tyack, 2000). Masking, or auditory interference, generally occurs when sounds in the environment are louder than, and of a similar frequency as, auditory signals an animal is trying to receive. Masking is a phenomenon that affects animals that are trying to receive acoustic information about their environment, including sounds from other members of their species, predators, prey, and sounds that allow them to orient in their environment. Masking these acoustic signals can disturb the behavior of individual animals, groups of animals, or entire populations. For the airgun sound generated from the proposed seismic survey, sound will consist of low frequency (under 500 Hz) pulses with extremely short durations (less than one second). There is little concern regarding masking near the sound source due to the brief duration of these pulses and relatively longer

silence between airgun shots (approximately 5-6 seconds). Masking from airguns is more likely in low-frequency marine mammals like mysticetes (which are not expected to occur in high numbers in the survey area in July and August). It is less likely for mid- to high-frequency cetaceans and pinnipeds.

Hearing impairment (either temporary or permanent) is unlikely. Given the higher level of sound necessary to cause permanent threshold shift as compared with temporary threshold shift, it is considerably less likely that permanent threshold shift would occur during the seismic survey in Prudhoe Bay. Cetaceans generally avoid the immediate area around operating seismic vessels, as do some other marine mammals. Some pinnipeds show avoidance reactions to airguns, but their avoidance reactions are generally not as strong or consistent as those of cetaceans, and occasionally they seem to be attracted to operating seismic vessels (NMFS, 2010).

Serious injury or mortality is not anticipated from use of the equipment. To date, there is no evidence that serious injury, death, or stranding by marine mammals can occur from exposure to airgun pulses, even in the case of large airgun arrays. Additionally, BP's project will use medium sized airgun arrays in shallow water. NMFS does not expect any marine mammals will incur serious injury or mortality in the shallow waters of Prudhoe Bay or strand as a result of the proposed seismic survey.

Active acoustic sources other than the airguns (i.e., pingers) are proposed for BP's 2014 seismic survey in Prudhoe Bay, Beaufort Sea, Alaska. In general, the potential effects of this equipment on marine mammals are similar to those from the airguns, except the magnitude of the impacts is expected to be much less due to the lower intensity of the source.

Vessel activity and noise associated with vessel activity will temporarily increase in the action area during BP's seismic survey as a result of the operation of 8-10 vessels. To minimize

the effects of vessels and noise associated with vessel activity, BP will alter speed if a marine mammal gets too close to a vessel. In addition, source vessels will be operating at slow speed (1-5 knots) when conducting surveys. Marine mammal monitoring observers will alert vessel captains as animals are detected to ensure safe and effective measures are applied to avoid coming into direct contact with marine mammals. Therefore, NMFS neither anticipates nor authorizes takes of marine mammals from ship strikes.

Anticipated Effects on Marine Mammal Habitat

The primary potential impacts to marine mammal habitat and other marine species are associated with elevated sound levels produced by airguns and other active acoustic sources. However, other potential impacts to the surrounding habitat from physical disturbance are also possible. The proposed IHA contains a full discussion of the potential impacts to marine mammal habitat and prey species in the project area. No changes have been made to that discussion. Please refer to the proposed IHA for the full discussion of potential impacts to marine mammal habitat (79 FR 21354, April 15, 2014). NMFS has determined that BP's 3D OBS seismic survey program is not expected to have any habitat-related effects that could cause significant or long-term consequences for individual marine mammals or their populations.

Mitigation

In order to issue an incidental take authorization (ITA) under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (where relevant). This section summarizes the required mitigation measures contained in the IHA.

Mitigation Measures in BP's Application

BP described general mitigation measures that apply to all vessels involved in the survey and specific mitigation measures that apply to the source vessels operating airguns. The protocols are discussed next and can also be found in Section 11 of BP's application (see ADDRESSES).

1. General Mitigation Measures

These general mitigation measures apply to all vessels that are part of the Prudhoe Bay seismic survey, including crew transfer vessels. The two source vessels will also operate under an additional set of specific mitigation measures during airgun operations (described later in this document).

The general mitigation measures include: (1) adjusting speed to avoid collisions with whales and during periods of low visibility; (2) checking the waters immediately adjacent to vessels with propellers to ensure that no marine mammals will be injured; (3) avoiding concentrations of groups of whales and not operating vessels in a way that separates members of a group; (4) reducing vessel speeds to less than 10 knots in the presence of feeding whales; (5) reducing speed and steering around groups of whales if circumstances allow (but never cutting off a whale's travel path) and avoiding multiple changes in direction and speed when within 900 ft of whales; (6) maintaining an altitude of at least 1,000 ft when flying helicopters, except in emergency situations or during take-offs and landings; and (7) not hovering or circling with helicopters above or within 0.3 mi of groups of whales.

2. Seismic Airgun Mitigation Measures

BP will establish and monitor Level A harassment exclusion zones for all marine mammal species. These zones will be monitored by PSOs (more detail later). Should marine

mammals enter these exclusion zones, the PSOs will call for and implement the suite of mitigation measures described next.

Ramp-up Procedure: Ramp-up procedures of an airgun array involve a step-wise increase in the number of operating airguns until the required discharge volume is achieved. The purpose of a ramp-up (sometimes referred to as “soft-start”) is to provide marine mammals in the vicinity of the activity the opportunity to leave the area and to avoid the potential for injury or impairment of their hearing abilities.

During ramp-up, BP will implement the common procedure of doubling the number of operating airguns at 5-minute intervals, starting with the smallest gun in the array. For the 620 in³ sub-array this is estimated to take approximately 15 minutes and for the 1,240 in³ airgun array approximately 20 minutes. During ramp-up, the exclusion zone for the full airgun array will be observed. The ramp-up procedures will be applied as follows:

1. A ramp-up, following a cold start, can be applied if the exclusion zone has been free of marine mammals for a consecutive 30-minute period. The entire exclusion zone must have been visible during these 30 minutes. If the entire exclusion zone is not visible, then ramp-up from a cold start cannot begin.

2. Ramp-up procedures from a cold start will be delayed if a marine mammal is sighted within the exclusion zone during the 30-minute period prior to the ramp-up. The delay will last until the marine mammal(s) has been observed to leave the exclusion zone or until the animal(s) is not sighted for at least 15 minutes (seals) or 30 minutes (cetaceans).

3. A ramp-up, following a shutdown, can be applied if the marine mammal(s) for which the shutdown occurred has been observed to leave the exclusion zone or until the animal(s) has not been sighted for at least 15 minutes (seals) or 30 minutes (cetaceans). This assumes there

was a continuous observation effort prior to the shutdown and the entire exclusion zone is visible.

4. If, for any reason, power to the airgun array has been discontinued for a period of 10 minutes or more, ramp-up procedures need to be implemented. Only if the PSO watch has been suspended, a 30-minute clearance of the exclusion zone is required prior to commencing ramp-up. Discontinuation of airgun activity for less than 10 minutes does not require a ramp-up.

5. The seismic operator and PSOs will maintain records of the times when ramp-ups start and when the airgun arrays reach full power.

Power Down Procedure: A power down is the immediate reduction in the number of operating airguns such that the radii of the 190 dB and 180 dB (rms) zones are decreased to the extent that an observed marine mammal is not in the applicable exclusion zone of the full array. During a power down, one airgun (or some other number of airguns less than the full airgun array) continues firing. The continued operation of one airgun is intended to (a) alert marine mammals to the presence of airgun activity, and (b) retain the option of initiating a ramp up to full operations under poor visibility conditions.

1. The array will be immediately powered down whenever a marine mammal is sighted approaching close to or within the applicable exclusion zone of the full array, but is outside the applicable exclusion zone of the single mitigation airgun;

2. Likewise, if a mammal is already within the exclusion zone when first detected, the airguns will be powered down immediately;

3. If a marine mammal is sighted within or about to enter the applicable exclusion zone of the single mitigation airgun, it too will be shut down; and

4. Following a power down, ramp-up to the full airgun array will not resume until the

marine mammal has cleared the applicable exclusion zone. The animal will be considered to have cleared the exclusion zone if it has been visually observed leaving the exclusion zone of the full array, or has not been seen within the zone for 15 minutes (seals) or 30 minutes (cetaceans).

Shut-down Procedures: The operating airgun(s) will be shut down completely if a marine mammal approaches or enters the 190 or 180 dB (rms) exclusion radius of the smallest airgun. Airgun activity will not resume until the marine mammal has cleared the applicable exclusion radius of the full array. The animal will be considered to have cleared the exclusion radius as described above under ramp-up procedures.

Poor Visibility Conditions: BP plans to conduct 24-hr operations. PSOs will not be on duty during ongoing seismic operations during darkness, given the very limited effectiveness of visual observation at night (there will be no periods of darkness in the survey area until mid-August). The provisions associated with operations at night or in periods of poor visibility include the following:

- If during foggy conditions, heavy snow or rain, or darkness (which may be encountered starting in late August), the full 180 dB exclusion zone is not visible, the airguns cannot commence a ramp-up procedure from a full shut-down; and
- If one or more airguns have been operational before nightfall or before the onset of poor visibility conditions, they can remain operational throughout the night or poor visibility conditions. In this case ramp-up procedures can be initiated, even though the exclusion zone may not be visible, on the assumption that marine mammals will be alerted by the sounds from the single airgun and have moved away.

BP is aware that available techniques to more effectively detect marine mammals during limited visibility conditions (darkness, fog, snow, and rain) are in need of development and has

in recent years supported research and field trials intended to improve methods of detecting marine mammals under these conditions. BP intends to continue research and field trials to improve methods of detecting marine mammals during periods of low visibility.

Additional Mitigation Measures Required by NMFS

The mitigation airgun will be operated at approximately one shot per minute and will not be operated for longer than three hours in duration during daylight hours and good visibility. In cases when the next start-up after the turn is expected to be during lowlight or low visibility, use of the mitigation airgun may be initiated 30 minutes before darkness or low visibility conditions occur and may be operated until the start of the next seismic acquisition line. The mitigation gun must still be operated at approximately one shot per minute.

NMFS clarified or refined some of the mitigation measures contained in BP's application (and listed earlier in this section). In low visibility conditions, NMFS requires BP to reduce speeds to 9 knots or less. Separately, NMFS has defined a group or concentration of whales as five or more individuals.

Mitigation Conclusions

NMFS has carefully evaluated BP's mitigation measures and considered a range of other measures in the context of ensuring that NMFS prescribes the means of effecting the least practicable impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another:

- The manner in which, and the degree to which, the successful implementation of the measures are expected to minimize adverse impacts to marine mammals;
- The proven or likely efficacy of the specific measure to minimize adverse impacts as

planned; and

- The practicability of the measure for applicant implementation.

Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS and those recommended by the public, NMFS has determined that the required mitigation measures provide the means of effecting the least practicable impact on marine mammals species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance. Measures to ensure availability of such species or stock for taking for certain subsistence uses are discussed later in this document (see "Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses" section).

Monitoring and Reporting

In order to issue an ITA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth "requirements pertaining to the monitoring and reporting of such taking". The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for ITAs must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area. BP submitted information regarding marine mammal monitoring to be conducted during seismic operations as part of the IHA application. That information can be found in Sections 11 and 13 of the application.

Monitoring Measures

1. Visual Monitoring

Two observers referred to as PSOs will be present on each seismic source vessel. Of these two PSOs, one will be on watch at all times to monitor the 190 and 180 dB exclusion zones

for the presence of marine mammals during airgun operations. The main objectives of the vessel-based marine mammal monitoring are as follows: (1) To implement mitigation measures during seismic operations (e.g. course alteration, airgun power down, shut-down and ramp-up); and (2) To record all marine mammal data needed to estimate the number of marine mammals potentially affected, which must be reported to NMFS within 90 days after the survey.

BP intends to work with experienced PSOs. At least one Alaska Native resident, who is knowledgeable about Arctic marine mammals and the subsistence hunt, is expected to be included as one of the team members aboard the vessels. Before the start of the seismic survey, the crew of the seismic source vessels will be briefed on the function of the PSOs, their monitoring protocol, and mitigation measures to be implemented.

On all source vessels, at least one observer will monitor for marine mammals at any time during daylight hours (there will be no periods of total darkness until mid-August). PSOs will be on duty in shifts of a maximum of 4 hours at a time, although the exact shift schedule will be established by the lead PSO in consultation with the other PSOs. In response to a public comment, language has been included in the IHA to clarify that the on-duty PSO must monitor for marine mammals 30 minutes before, during, and 30 minutes after the use of the seismic airguns.

The source vessels will offer suitable platforms for marine mammal observations. Observations will be made from locations where PSOs have the best view around the vessel. During daytime, the PSO(s) will scan the area around the vessel systematically with reticle binoculars and with the naked eye. Because the main purpose of the PSO on board the vessel is detecting marine mammals for the implementation of mitigation measures according to specific guidelines, BP prefers (and NMFS agrees) to keep the information to be recorded as concise as

possible, allowing the PSO to focus on detecting marine mammals. The following information will be collected by the PSOs:

- Environmental conditions – consisting of sea state (in Beaufort Wind force scale according to NOAA), visibility (in km, with 10 km indicating the horizon on a clear day), and sun glare (position and severity). These will be recorded at the start of each shift, whenever there is an obvious change in one or more of the environmental variables, and whenever the observer changes shifts;
- Project activity – consisting of airgun operations (on or off), number of active guns, line number. This will be recorded at the start of each shift, whenever there is an obvious change in project activity, and whenever the observer changes shifts; and
- Sighting information – consisting of the species (if determinable), group size, position and heading relative to the vessel, behavior, movement, and distance relative to the vessel (initial and closest approach). These will be recorded upon sighting a marine mammal or group of animals.

When marine mammals in the water are detected within or about to enter the designated exclusion zones, the airgun(s) power down or shut-down procedures will be implemented immediately. To assure prompt implementation of power downs and shut-downs, multiple channels of communication between the PSOs and the airgun technicians will be established. During the power down and shut-down, the PSO(s) will continue to maintain watch to determine when the animal(s) are outside the exclusion radius. Airgun operations can resume with a ramp-up procedure (depending on the extent of the power down) if the observers have visually confirmed that the animal(s) moved outside the exclusion zone, or if the animal(s) were not observed within the exclusion zone for 15 minutes (seals) or for 30 minutes (cetaceans). Direct

communication with the airgun operator will be maintained throughout these procedures.

All marine mammal observations and any airgun power down, shut-down, and ramp-up will be recorded in a standardized format. Data will be entered into or transferred to a custom database. The accuracy of the data entry will be verified daily through QA/QC procedures. Recording procedures will allow initial summaries of data to be prepared during and shortly after the field program, and will facilitate transfer of the data to other programs for further processing and archiving.

2. Fish and Airgun Sound Monitoring

BP proposes to conduct research on fish species in relation to airgun operations, including prey species important to ice seals, during the proposed seismic survey. The North Prudhoe Bay OBS seismic survey offers a unique opportunity to assess the impacts of airgun sounds on fish, specifically on changes in fish abundance in fyke nets that have been sampled in the area for more than 30 years. The monitoring study would occur over a 2-month period during the open-water season. During this time, fish are counted and sized every day, unless sampling is prevented by weather, the presence of bears, or other events. Fish mortality is also noted.

The fish-sampling period coincides with the North Prudhoe seismic survey, resulting in a situation where each of the four fyke nets will be exposed to varying daily exposures to airgun sounds. That is, as source vessels move back and forth across the project area, fish caught in nets will be exposed to different sounds levels at different nets each day. To document relationships between fish catch in each fyke net and received sound levels, BP will attempt to instrument each fyke net location with a recording hydrophone. Recording hydrophones, to the extent possible, will have a dynamic range that extends low enough to record near ambient

sounds and high enough to capture sound levels during relatively close approaches by the airgun array (i.e., likely levels as high as about 200 dB re 1 uPa). Bandwidth will extend from about 10 Hz to at least 500 Hz. In addition, because some fish (especially salmonids) are likely to be sensitive to particle velocity instead of or in addition to sound pressure level, BP will attempt to instrument each fyke net location with a recording particle velocity meter. Acoustic and environmental data will be used in statistical models to assess relationships between acoustic and fish variables. Additional information on the details of the fish monitoring study can be found in Section 13.1 of BP's application (see ADDRESSES).

Monitoring Plan Peer Review

The MMPA requires that monitoring plans be independently peer reviewed "where the proposed activity may affect the availability of a species or stock for taking for subsistence uses" (16 U.S.C. 1371(a)(5)(D)(ii)(III)). Regarding this requirement, NMFS' implementing regulations state, "Upon receipt of a complete monitoring plan, and at its discretion, [NMFS] will either submit the plan to members of a peer review panel for review or within 60 days of receipt of the proposed monitoring plan, schedule a workshop to review the plan" (50 CFR 216.108(d)).

NMFS convened an independent peer review panel, comprised of experts in the fields of marine mammal ecology and underwater acoustics, to review BP's Prudhoe Bay OBS Seismic Survey Monitoring Plan. The panel met on January 8-9, 2013, and provided their final report to NMFS on February 25, 2013. The full panel report can be viewed on the Internet at:

http://www.nmfs.noaa.gov/pr/pdfs/permits/openwater/bp_panel2013.pdf.

NMFS provided the panel with BP's monitoring plan and asked the panel to answer the following questions regarding the plan:

1. Will the applicant's stated objectives effectively further the understanding of the impacts of their activities on marine mammals and otherwise accomplish the goals stated above?

If not, how should the objectives be modified to better accomplish the goals above?

2. Can the applicant achieve the stated objectives based on the methods described in the plan?

3. Are there technical modifications to the proposed monitoring techniques and methodologies proposed by the applicant that should be considered to better accomplish their stated objectives?

4. Are there techniques not proposed by the applicant (i.e., additional monitoring techniques or methodologies) that should be considered for inclusion in the applicant's monitoring program to better accomplish their stated objectives?

5. What is the best way for an applicant to present their data and results (formatting, metrics, graphics, etc.) in the required reports that are to be submitted to NMFS (i.e., 90-day report and comprehensive report)?

NMFS shared the panel's report with BP in March 2013. BP originally submitted this IHA application with a monitoring plan to conduct this program during the 2013 open-water season; however, after undergoing peer review of the monitoring plan in early 2013, BP subsequently cancelled the 2013 operation. The 2014 program is the same as that reviewed by the panel in 2013. BP reviewed the 2013 panel recommendation report and incorporated several of the panel's recommendations into the monitoring plan contained in the 2014 application. NMFS reviewed the panel's report and agrees with the recommendations included in BP's 2014 monitoring plan. A summary of the measures that were included is provided next.

Based on the panel report, BP will follow a pre-determined regime for scanning of the

area by PSOs that is based on the relative importance of detecting marine mammals in the near- and far fields. PSOs will simply record the primary behavioral state (i.e., traveling, socializing, feeding, resting, approaching or moving away from vessels) and relative location of the observed marine mammals and not try to precisely determine the behavior or the context.

Other recommendations made by panel members that NMFS supports and has included in the monitoring measures include: (1) recording observations of pinnipeds on land and not just in the water; (2) developing a means by which PSOs record data with as little impact on observation time as possible; (3) continuing PSO observation watches when there is an extended period when no airguns on any of the source vessels are operating to collect additional observation data during periods of non-seismic; and (4) accounting for factors such as water depth when estimating the actual level of takes because of the difficulties in monitoring during darkness or inclement weather. Moreover, the panel recommended and NMFS agrees that BP should be very clear in the 90-day technical report about what periods are considered “seismic” and “non-seismic” for their analyses.

As recommended by the panel, NMFS encourages BP to examine data from ASAMM and other such programs to assess possible impacts from their seismic surveys. As noted earlier in this document, BP has proposed a fish and airgun sound monitoring study, which has been well received by past panel members. This study will also allow BP to collect sound signature data on equipment used during this proposed survey.

The panel also recommended that BP work to understand the cumulative nature of the activity and sound footprint. As described in Section 14 of the IHA application, BP remains committed to working with a wide range of experts to improve understanding of the cumulative effects of multiple sound sources and has sponsored an expert working group on the issue.

Reporting Measures

1. 90-Day Technical Report

A report will be submitted to NMFS within 90 days after the end of the proposed seismic survey. The report will summarize all activities and monitoring results conducted during in-water seismic surveys. The Technical Report will include the following:

- Summary of project start and end dates, airgun activity, number of guns, and the number and circumstances of implementing ramp-up, power down, shutdown, and other mitigation actions;
- Summaries of monitoring effort (e.g., total hours, total distances, and marine mammal distribution through the study period, accounting for sea state and other factors affecting visibility and detectability of marine mammals);
- Analyses of the effects of various factors influencing detectability of marine mammals (e.g., sea state, number of observers, and fog/glare);
- Species composition, occurrence, and distribution of marine mammal sightings, including date, water depth, numbers, age/size/gender categories (if determinable), and group sizes;
- Analyses of the effects of survey operations;
- Sighting rates of marine mammals during periods with and without seismic survey activities (and other variables that could affect detectability), such as: (i) initial sighting distances versus survey activity state; (ii) closest point of approach versus survey activity state; (iii) observed behaviors and types of movements versus survey activity state; (iv) numbers of sightings/individuals seen versus survey activity state; (v) distribution around the source vessels versus survey activity state; and (vi) estimates of exposures of marine mammals to Level B

harassment thresholds based on presence in the 160 dB harassment zone.

2. Fish and Airgun Sound Report

BP will present the results of the fish and airgun sound study to NMFS in a detailed report. BP proposes to also submit that report to a peer reviewed journal for publication and present the results at a scientific conference and in Barrow and Nuiqsut.

3. Notification of Injured or Dead Marine Mammals

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA, such as an injury (Level A harassment), serious injury or mortality (e.g., ship-strike, gear interaction, and/or entanglement), BP would immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinators. The report would include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and

- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with BP to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. BP would not be able to resume their activities until notified by NMFS via letter, email, or telephone.

In the event that BP discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), BP would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators. The report would include the same information identified in the paragraph above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with BP to determine whether modifications in the activities are appropriate.

In the event that BP discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., carcass with moderate to advanced decomposition, or scavenger damage), BP would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators, within 24 hours of the discovery. BP would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. Activities may continue while NMFS reviews the circumstances of the incident.

Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]. Only take by Level B behavioral harassment of some species is anticipated as a result of the OBS seismic survey. Anticipated impacts to marine mammals are associated with noise propagation from the sound sources (e.g., airguns and pingers) used in the seismic survey. No take is expected to result from vessel strikes because of the slow speed of the vessels (1-5 knots while acquiring seismic data) and because of mitigation measures to reduce collisions with marine mammals. Additionally, no take is expected to result from helicopter operations because of altitude restrictions.

BP requested take of 11 marine mammal species by Level B harassment. However, for reasons mentioned earlier in this document, we have determined it is highly unlikely that humpback and minke whales would occur in the seismic survey area. Therefore, NMFS has not authorized take of these two species. The species for which take, by Level B harassment only, is authorized include: bowhead, beluga, gray, and killer whales; harbor porpoise; and ringed, bearded, spotted, and ribbon seals.

The airguns produce impulsive sounds. The current acoustic thresholds used by NMFS to estimate Level B and Level A harassment are presented in Table 2.

Table 2. Current acoustic exposure criteria used by NMFS.

Criterion	Criterion Definition	Threshold
Level A Harassment (Injury)	Permanent Threshold Shift (PTS) (Any level above that which is known to cause TTS)	180 dB re 1 microPa-m (cetaceans) / 190 dB re 1 microPa-m (pinnipeds) root mean square (rms)
Level B Harassment	Behavioral Disruption (for impulse noises)	160 dB re 1 microPa-m (rms)
Level B Harassment	Behavioral Disruption (for continuous, noise)	120 dB re 1 microPa-m (rms)

Section 6 of BP's application contains a description of the methodology used by BP to estimate takes by harassment, including calculations for the 160 dB (rms) isopleth and marine mammal densities in the areas of operation (see ADDRESSES), which was also provided in the proposed IHA notice (79 FR 21354, April 15, 2014). NMFS verified BP's methods, and used the density and sound isopleth measurements in estimating take. However, after initiating ESA section 7 consultation on this action, NMFS noticed that BP rounded the average 180 and 190 dB (rms) isopleths to the nearest 100 but rounded the average 160 dB (rms) isopleth to the nearest 5 km instead of the nearest 100. This resulted in a 160 dB isopleth more than twice the average expected distance of the isopleth. Table 7 in BP's application presented the largest average 160 dB isopleth as 2,182 m but calculated take assuming a 160 dB isopleth as 5,000 m. To remain consistent with the estimation of the other isopleths, NMFS has only rounded the average 160 dB isopleth for the 620 in³ array to 2,200 m. However, for reasons explained below this only changed the estimated take level for bowhead whales. Also, as noted later in this section, NMFS authorized the maximum number of estimated takes for all species, not just for cetaceans as presented by BP in order to ensure that exposure estimates are not underestimated for pinnipeds.

During data acquisition, the source vessels of the proposed OBS Prudhoe Bay seismic survey will cover an area of about 190 mi² in water depths ranging from 3 to 50 ft. Seismic data acquisition will be halted at the start of the Cross Island fall bowhead whale hunt. The total

duration of seismic data acquisition in the Prudhoe Bay area is estimated to be approximately 45 days. About 25% of downtime is included in this total, so the actual number of days that airguns are expected to be operating is about 34, based on a continuous 24-hr operation.

Marine Mammal Density Estimates

The Notice of Proposed IHA (79 FR 21354, April 15, 2014) contained a complete description of the derivation of the marine mammal density estimates. That discussion has not changed and is therefore not repeated here.

Level A and Level B Harassment Zone Distances

For the 2014 OBS seismic survey, BP used existing SSV measurements to establish distances to received sound pressure levels (SPLs). The Notice of Proposed IHA (79 FR 21354, April 15, 2014) contained a complete description of the derivation of the Level A and Level B harassment zone distances. With the exception of slightly altering the distances of the Level B harassment zone, as described above, nothing in the discussion has changed. Therefore, the entire discussion is not repeated here.

Table 3 in this document presents the radii used to estimate take (160 dB isopleth) and to implement mitigation measures (180 dB and 190 dB isopleths) from the full airgun array and the 40 in³ and 10 in³ mitigation guns. However, take is only estimated using the larger radius of the full airgun array.

Table 3. Distances (in meters) to be used for estimating take by Level B harassment and for mitigation purposes during the proposed 2014 North Prudhoe Bay seismic survey.

Airgun Discharge Volume (in³)	190 dB re 1 µPa	180 dB re 1 µPa	160 dB re 1 µPa
620-1240 in ³	300	600	2200
40 in ³	70	200	1100
10 in ³	20	50	500

Numbers of Marine Mammals Potentially Taken by Harassment

The potential number of marine mammals that might be exposed to the 160 dB re 1 µPa

(rms) SPL was calculated differently for cetaceans and pinnipeds, as described in Section 6.3 of BP's application and the Notice of Proposed IHA (79 FR 21354, April 15, 2014). The change to the 160 dB isopleth for the full array only had implications for the take estimate for bowhead whales. Because of the method used to calculate takes for pinnipeds, the isopleth change did not change the pinniped takes described in those earlier documents. Additionally, the change did not alter the proposed take estimates for other cetacean species. Therefore, those discussions are not repeated here.

1. Number of Bowheads Potentially Taken by Harassment

The potential number of bowhead whales that might be exposed to the 160 dB re 1 μ Pa (rms) SPL was calculated by multiplying:

- The expected bowhead density as provided in Table 5 in BP's application;
- The anticipated area around each source vessel that is ensonified by the 160 dB re 1 μ Pa (rms) SPL; and
- The estimated number of 24-hr days that the source vessels are operating.

The area expected to be ensonified by the 620-1,240 in³ array was determined based on the distance to the 160 dB re 1 μ Pa (rms) SPL as determined from the average 640-880 in³ array measurements (Table 7 in BP's application and summarized in Table 3 in this document), rounded to the nearest 100. Based on a radius of 2.2 km, the 160 dB isopleth used in the exposure calculations was 15.2 km². It is expected that on average, two source vessels will be operating simultaneously, although one source vessel might sometimes be engaged in crew change, maintenance, fueling, or other activities that do not require the operation of airguns. The minimum distance between the two source vessels will be about 550 ft. Although there will be an overlap in the ensonified area, for the estimated number of exposures, BP summed the

exposed area of each source vessel. Using the maximum distance and summing the isopleths of both source vessels provides a likely overestimate of marine mammal exposures.

The estimated number of 24-hr days of airgun operations was determined by assuming a 25% downtime during the 45-day planned data acquisition period. Downtime is related to weather, equipment maintenance, mitigation implementation, and other circumstances. The total number of full 24-hr days that data acquisition is expected to occur is approximately 34 days or 816 hours.

Based on this revision to the 160 dB isopleth, the average and maximum number of bowhead whales potentially exposed to sound levels of 160 dB re 1 μ Pa (rms) or more is estimated at 2 and 6, respectively. NMFS has authorized the maximum number of expected exposures based on the unexpected large numbers of bowheads observed in August during the 2013 ASAMM survey. These estimated exposures do not take into account the proposed mitigation measures, such as PSOs watching for animals, shutdowns or power downs of the airguns when marine mammals are seen within defined ranges, and ramp-up of airguns.

Estimated Take by Harassment Summary

Table 4 here outlines the density estimates used to estimate Level B takes, the authorized Level B harassment take levels, the abundance of each species in the Beaufort Sea, the percentage of each species or stock estimated to be taken, and current population trends. NMFS authorized the maximum estimates of exposures. Density estimates are not available for species that are uncommon in the proposed seismic survey area.

Table 4. Density estimates or species sighting rates, authorized Level B harassment take levels, species or stock abundance, percentage of population proposed to be taken, and species trend status.

Species	Density (#/km ²)	Sighting Rate (ind/hr)	Authorized Level B Take	Abundance	Percentage of Population	Trend
Beluga whale	0.0105	-	75	39,258	0.19	No reliable information

Killer whale	NA	-	3	552	0.54	Stable
Harbor porpoise	NA	-	3	48,215	0.01	No reliable information
Bowhead whale	0.0055	-	6	16,892	0.04	Increasing
Gray whale	NA	-	3	19,126	0.02	Increasing
Bearded seal	-	0.107	87	155,000	0.06	No reliable information
Ringed seal	-	0.397	324	300,000	0.11	No reliable information
Spotted seal	-	0.126	103	141,479	0.07	No reliable information
Ribbon seal	-	NA	3	49,000	0.01	No reliable information

Analysis and Determinations

Negligible Impact

Negligible impact is “an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival” (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (i.e., population-level effects). An estimate of the number of Level B harassment takes, alone, is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be “taken” through behavioral harassment, NMFS must consider other factors, such as the likely nature of any responses (their intensity, duration, etc.), the context of any responses (critical reproductive time or location, migration, etc.), as well as the number and nature of estimated Level A harassment takes, the number of estimated mortalities, effects on habitat, and the status of the species.

No injuries or mortalities are anticipated to occur as a result of BP’s 3D OBS seismic survey, and none are authorized. Additionally, animals in the area are not expected to incur hearing impairment or non-auditory physiological effects. The number of takes that are

authorized are expected to be limited to short-term Level B behavioral harassment. While the airguns will be operated continuously for about 34 days, the project time frame will occur when cetacean species are typically not found in the project area or are found only in low numbers. While pinnipeds are likely to be found in the project area more frequently, their distribution is dispersed enough that they likely will not be in the Level B harassment zone continuously. As mentioned previously, pinnipeds appear to be more tolerant of anthropogenic sound than mysticetes.

The Alaskan Beaufort Sea is part of the main migration route of the Western Arctic stock of bowhead whales. However, the seismic survey has been planned to occur when the majority of the population is found in the Canadian Beaufort Sea. Active airgun operations will cease by midnight on August 25 before the main fall migration begins and well before cow/calf pairs begin migrating through the area. Additionally, several locations within the Beaufort Sea serve as feeding grounds for bowhead whales. However, the primary feeding grounds are not found in Prudhoe Bay. The majority of bowhead whales feed in the Alaskan Beaufort Sea during the fall migration period, which will occur after the cessation of the airgun survey.

Belugas that migrate through the U.S. Beaufort Sea typically do so farther offshore (more than 37 mi [60 km]) and in deeper waters (more than 656 ft [200 m]) than where the 3D OBS seismic survey activities would occur. Gray whales are rarely sighted this far east in the U.S. Beaufort Sea. Additionally, there are no known feeding grounds for gray whales in the Prudhoe Bay area. The most northern feeding sites known for this species are located in the Chukchi Sea near Hanna Shoal and Point Barrow. The other cetacean species for which take is authorized are uncommon in Prudhoe Bay, and no known feeding or calving grounds occur in Prudhoe Bay for these species. Based on these factors, exposures of cetaceans to anthropogenic sounds are not

expected to last for prolonged periods (i.e., several days or weeks) since they are not known to remain in the area for extended periods of time in July and August. Also, the shallow water location of the survey makes it unlikely that cetaceans would remain in the area for prolonged periods. Based on all of this information, the proposed project is not anticipated to affect annual rates of recruitment or survival for cetaceans in the area.

Ringed seals breed and pup in the Alaskan Beaufort Sea; however, the seismic survey will occur outside of the breeding and pupping seasons. The Beaufort Sea does not provide suitable habitat for the other three ice seal species for breeding and pupping. Based on this information, the proposed project is not anticipated to affect annual rates of recruitment or survival for pinnipeds in the area.

Of the nine marine mammal species for which take is authorized, one is listed as endangered under the ESA--the bowhead whale—and two are listed as threatened—ringed and bearded seals. Schweder *et al.* (2009) estimated the yearly growth rate for bowhead whales to be 3.2% (95% CI = 0.5-4.8%) between 1984 and 2003 using a sight-resight analysis of aerial photographs. There are currently no reliable data on trends of the ringed and bearded seal stocks in Alaska. The ribbon seal is listed as a species of concern under the ESA. Certain stocks or populations of gray, killer, and beluga whales and spotted seals are listed as endangered or are proposed for listing under the ESA; however, none of those stocks or populations occur in the activity area. There is currently no established critical habitat in the project area for any of these nine species.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the required monitoring and mitigation measures, NMFS finds that the total marine mammal take

from BP's 3D OBS seismic survey in Prudhoe Bay, Beaufort Sea, Alaska, will have a negligible impact on the affected marine mammal species or stocks.

Small Numbers

The requested takes authorized represent less than 1% of all populations or stocks (see Table 4 in this document). These take estimates represent the percentage of each species or stock that could be taken by Level B behavioral harassment if each animal is taken only once. The numbers of marine mammals taken are small relative to the affected species or stock sizes. In addition, the mitigation and monitoring measures (described previously in this document) required in the IHA are expected to reduce even further any potential disturbance to marine mammals. NMFS finds that small numbers of marine mammals will be taken relative to the populations of the affected species or stocks.

Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses

Relevant Subsistence Uses

The disturbance and potential displacement of marine mammals by sounds from the seismic survey are the principal concerns related to subsistence use of the area. Subsistence remains the basis for Alaska Native culture and community. Marine mammals are legally hunted in Alaskan waters by coastal Alaska Natives. In rural Alaska, subsistence activities are often central to many aspects of human existence, including patterns of family life, artistic expression, and community religious and celebratory activities. Additionally, the animals taken for subsistence provide a significant portion of the food that will last the community throughout the year. The main species that are hunted include bowhead and beluga whales, ringed, spotted, and bearded seals, walrus, and polar bears. (As mentioned previously in this document, both the walrus and the polar bear are under the USFWS' jurisdiction.) The importance of each of these

species varies among the communities and is largely based on availability.

Residents of the village of Nuiqsut are the primary subsistence users in the project area. The communities of Barrow and Kaktovik also harvest resources that pass through the area of interest but do not hunt in or near the Prudhoe Bay area. Subsistence hunters from all three communities conduct an annual hunt for autumn-migrating bowhead whales. Barrow also conducts a bowhead hunt in spring. Residents of all three communities hunt seals. Other subsistence activities include fishing, waterfowl and seaduck harvests, and hunting for walrus, beluga whales, polar bears, caribou, and moose.

Nuiqsut is the community closest to the seismic survey area (approximately 54 mi [87 km] southwest). Nuiqsut hunters harvest bowhead whales only during the fall whaling season (Long, 1996). In recent years, Nuiqsut whalers have typically landed three or four whales per year. Nuiqsut whalers concentrate their efforts on areas north and east of Cross Island, generally in water depths greater than 66 ft (20 m; Galginaitis, 2009). Cross Island is the principal base for Nuiqsut whalers while they are hunting bowheads (Long, 1996). Cross Island is located approximately 35 mi (56.4 km) east of the seismic survey area.

Kaktovik whalers search for whales east, north, and occasionally west of Kaktovik. Kaktovik is located approximately 120 mi (193 km) east of Prudhoe Bay. The western most reported harvest location was about 13 mi (21 km) west of Kaktovik, near 70°10' N., 144°11' W. (Kaleak, 1996). That site is about 112 mi (180 km) east of the proposed survey area.

Barrow whalers search for whales much farther from the Prudhoe Bay area—about 155+ mi (250+ km) to the west. Barrow hunters have expressed concerns about “downstream” effects to bowhead whales during the westward fall migration; however, BP will cease airgun operations prior to the start of the fall migration.

Beluga whales are not a prevailing subsistence resource in the communities of Kaktovik and Nuiqsut. Kaktovik hunters may harvest one beluga whale in conjunction with the bowhead hunt; however, it appears that most households obtain beluga through exchanges with other communities. Although Nuiqsut hunters have not hunted belugas for many years while on Cross Island for the fall hunt, this does not mean that they may not return to this practice in the future. Data presented by Braund and Kruse (2009) indicate that only 1% of Barrow's total harvest between 1962 and 1982 was of beluga whales and that it did not account for any of the harvested animals between 1987 and 1989.

Ringed seals are available to subsistence users in the Beaufort Sea year-round, but they are primarily hunted in the winter or spring due to the rich availability of other mammals in the summer. Bearded seals are primarily hunted during July in the Beaufort Sea; however, in 2007, bearded seals were harvested in the months of August and September at the mouth of the Colville River Delta, which is approximately 50+ mi (80+ km) from the proposed seismic survey area. However, this sealing area can reach as far east as Pingok Island, which is approximately 20 mi (32 km) west of the survey area. An annual bearded seal harvest occurs in the vicinity of Thetis Island (which is a considerable distance from Prudhoe Bay) in July through August. Approximately 20 bearded seals are harvested annually through this hunt. Spotted seals are harvested by some of the villages in the summer months. Nuiqsut hunters typically hunt spotted seals in the nearshore waters off the Colville River Delta. The majority of the more established seal hunts that occur in the Beaufort Sea, such as the Colville delta area hunts, are located a significant distance (in some instances 50 mi [80 km] or more) from the project area.

Potential Impacts to Subsistence Uses

NMFS has defined "unmitigable adverse impact" in 50 CFR 216.103 as: "...an impact

resulting from the specified activity: (1) That is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by: (i) Causing the marine mammals to abandon or avoid hunting areas; (ii) Directly displacing subsistence users; or (iii) Placing physical barriers between the marine mammals and the subsistence hunters; and (2) That cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.”

Noise and general activity during BP’s 3D OBS seismic survey have the potential to impact marine mammals hunted by Native Alaskan. In the case of cetaceans, the most common reaction to anthropogenic sounds (as noted previously) is avoidance of the ensonified area. In the case of bowhead whales, this often means that the animals divert from their normal migratory path by several kilometers. Helicopter activity also has the potential to disturb cetaceans and pinnipeds by causing them to vacate the area. Additionally, general vessel presence in the vicinity of traditional hunting areas could negatively impact a hunt. Native knowledge indicates that bowhead whales become increasingly “skittish” in the presence of seismic noise. Whales are more wary around the hunters and tend to expose a much smaller portion of their back when surfacing (which makes harvesting more difficult). Additionally, natives report that bowheads exhibit angry behaviors in the presence of seismic, such as tail-slapping, which translate to danger for nearby subsistence harvesters.

Plan of Cooperation or Measures to Minimize Impacts to Subsistence Hunts

Regulations at 50 CFR 216.104(a)(12) require IHA applicants for activities that take place in Arctic waters to provide a Plan of Cooperation or information that identifies what measures have been taken and/or will be taken to minimize adverse effects on the availability of marine mammals for subsistence purposes. BP signed the 2014 Conflict Avoidance Agreement

(CAA) with the Alaska Eskimo Whaling Commission (AEWC), which is developed to minimize potential interference with bowhead subsistence hunting. BP also attended and participated in meetings with the AEWC on December 13, 2013, and additional meetings in 2014. The CAA describes measures to minimize any adverse effects on the availability of bowhead whales for subsistence uses.

The North Slope Borough Department of Wildlife Management (NSB-DWM) was consulted, and BP presented the project to the NSB Planning Commission in 2014. BP held meetings in the community of Nuiqsut to present the proposed project, address questions and concerns from community members, and provide them with contact information of project management to which they can direct concerns during the survey. During the NMFS Open-Water Meeting in Anchorage in 2013, BP presented their proposed projects to various stakeholders that were present during this meeting.

BP will continue to engage with the affected subsistence communities regarding its Beaufort Sea activities. As in previous years, BP will meet formally and/or informally with several stakeholder entities: the NSB Planning Department, NSB-DWM, NMFS, AEWC, Inupiat Community of the Arctic Slope, Inupiat History Language and Culture Center, USFWS, Nanuq and Walrus Commissions, and Alaska Department of Fish & Game.

Project information was provided to and input on subsistence obtained from the AEWC and Nanuq Commission at the following meetings:

- AEWC, October 17, 2013; and
- Nanuq Commission, October 17, 2013.

BP will implement several mitigation measures to reduce impacts on the availability of marine mammals for subsistence hunts in the Beaufort Sea. Many of these measures were

developed from the 2013 CAA and previous NSB Development Permits. In addition to the measures listed next, BP will conclude all airgun operations by midnight on August 25 to allow time for the Beaufort Sea communities to prepare for their fall bowhead whale hunts prior to the beginning of the fall westward migration through the Beaufort Sea. Some of the measures mentioned next have been mentioned previously in this document:

- PSOs on board vessels are tasked with looking out for whales and other marine mammals in the vicinity of the vessel to assist the vessel captain in avoiding harm to whales and other marine mammals.;

- Vessels and aircraft will avoid areas where species that are sensitive to noise or vessel movements are concentrated;

- Communications and conflict resolution are detailed in the CAA. BP will participate in the Communications Center that is operated annually during the bowhead subsistence hunt;

- Communications with the village of Nuiqsut to discuss community questions or concerns including all subsistence hunting activities. Pre-project meeting(s) with Nuiqsut representatives will be held at agreed times with groups in the community of Nuiqsut. If additional meetings are requested, they will be set up in a similar manner;

- Contact information for BP will be provided to community members and distributed in a manner agreed at the community meeting;

- BP has contracted with a liaison from Nuiqsut who will help coordinate meetings and serve as an additional contact for local residents during planning and operations; and

- Inupiat Communicators will be employed and work on seismic source vessels. They will also serve as PSOs.

Unmitigable Adverse Impact Analysis and Determination

BP has adopted a spatial and temporal strategy for its Prudhoe Bay survey that should minimize impacts to subsistence hunters. First, BP's activities will not commence until after the spring hunts have occurred. Second, BP will conclude all airgun operations by midnight on August 25 prior to the start of the bowhead whale fall westward migration and any fall subsistence hunts by Beaufort Sea communities. Prudhoe Bay is not commonly used for subsistence hunts. Although some seal hunting co-occurs temporally with BP's seismic survey, the locations do not overlap. BP's presence will not place physical barriers between the sealers and the seals. BP will work closely with the closest affected communities and support Communications Centers and employ local Inupiat Communicators. Based on the description of the specified activity, the measures described to minimize adverse effects on the availability of marine mammals for subsistence purposes, and the required mitigation and monitoring measures, NMFS has determined that there will not be an unmitigable adverse impact on subsistence uses from BP's activities.

Endangered Species Act (ESA)

Within the project area, the bowhead whale is listed as endangered and the ringed and bearded seals are listed as threatened under the ESA. The NMFS Office of Protected Resources Permits and Conservation Division consulted with the NMFS Alaska Regional Office (AKRO) Protected Resources Division (PRD) on the issuance of an IHA under Section 101(a)(5)(D) of the MMPA because the action of issuing the IHA may affect threatened and endangered species under NMFS' jurisdiction. On June 10, 2014, NMFS AKRO PRD issued a Biological Opinion, which concluded that the issuance of an IHA to BP for the 3D OBS seismic survey is not likely to jeopardize the continued existence of the endangered bowhead whale, threatened Arctic subspecies of ringed seal, or the threatened Beringia distinct population segment of bearded seal.

There is no critical habitat for any of these species in the survey area.

National Environmental Policy Act (NEPA)

NMFS prepared an EA that includes an analysis of potential environmental effects associated with NMFS' issuance of an IHA to BP to take marine mammals incidental to conducting a 3D OBS seismic survey program in the Beaufort Sea, Alaska. NMFS has finalized the EA and prepared a FONSI for this action. Therefore, preparation of an Environmental Impact Statement is not necessary.

Authorization

As a result of these determinations, NMFS has issued an IHA to BP for conducting a 3D OBS seismic survey in the Prudhoe Bay area of the Beaufort Sea, Alaska, during the 2014 open-water season, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: June 25, 2014.

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